

AMENDMENTS TO THE CLAIMS

The following listing of claims will replace all prior versions and listings of claims in the application.

LISTING OF CLAIMS

1. (Cancelled).
2. (Previously Presented) The system of Claim 21, wherein the shank and the mandrel are positively connectably geometrically.
3. (Previously Presented) The system of Claim 21, wherein the shank and the mandrel are detachably connectable.
4. (Previously Presented) The system of Claim 3, wherein the shank and the mandrel are threadably connectable.
5. (Previously Presented) The system of Claim 21, wherein the mandrel foot and the shank end are threadably connectable.
6. (Previously Presented) The system of Claim 21, comprising:
the mandrel foot including an external thread; and
the shank end including an internal thread engageable with the external thread of the mandrel foot.

7. (Withdrawn and Currently Amended) The system of Claim 77 [[21]], further comprising:

the mandrel foot having a first diameter; and

an outside of the second end of the shank ~~and having the punching edge formed thereon~~ having a second diameter;

wherein the first diameter is ~~one of~~ equal to or [[and]] greater than the second diameter.

8. (Cancelled)

9. (Previously Presented) The system of Claim 21, wherein the setting head comprises a diameter greater than any one of a deformation segment diameter, a shank end diameter and a mandrel foot diameter.

10. (Previously Presented) The system of Claim 21, wherein the fastener is metal.

11. (Currently Amended) The system of Claim 77 [[10]], wherein the fastener ~~metal~~ comprises at least one of aluminum and an aluminum alloy.

12. (Currently Amended) The system of Claim 21, wherein a cross section of the fastener ~~fastening element~~ is substantially circular.

13. (Withdrawn and Currently Amended) The system of Claim 77 [[21]], wherein the head of the mandrel is enlarged ~~a cross section of the fastening element is substantially polygonal.~~

14. (Previously Presented) The system of Claim 21, wherein the mandrel head comprises a fastener driving element.

15. (Previously Presented) The system of Claim 21, wherein the shank comprises an open end.

16. (Withdrawn and Currently Amended) The system of Claim 77 [[21]], wherein the connecting segment of the shank has a thread which engages the foot of the mandrel ~~comprises a closed end.~~

7-20. (Cancelled)

21. (Currently Amended) A fastener setting system, comprising:

a fastener including:

(i) a non-frangible mandrel having a foot and an enlarged head; and

(ii) a hollow shank including:

(a) a setting head at a free end;

(b) a deformation segment for forming a closure head;

(c) a connecting segment ~~configurable inside the shank~~ operably forming a fastenable connection with the mandrel foot; and

(d) a shank end opposed to the setting head having a workpiece self-piercing ~~workpiece self-piercing~~ edge extending substantially along an outermost periphery of the shank;

a die;

a ram detachably connectable to the mandrel and operably advancing the fastener toward the die by pushing against the head of the mandrel.

22. (Original) A device, comprising:

a fastening element having a setting head and a mandrel engageable into at least one part;

a die;

a ram operably punching the fastening element through the at least one part;

a holding tool operably holding the setting head against the at least one part; and

a traction tool operably retracting the mandrel;

wherein the ram and the holding tool are movable relative to the die independently of each other.

23. (Original) The device of Claim 22, wherein the mandrel comprises an external thread operably forming a releasable connection with the fastening element.

24. (Original) The device of Claim 22, wherein the die comprises a disposal passage operably disposing each of a plurality of punched parts.

25. (Original) The device of Claim 22, comprising a counterforce structure operable to dynamically interlock the ram and the die.

26. (Original) The device of claim 22, comprising at least one of:
a moving means;
a means for determining a ram position;
a means for determining a holding tool position; and
at least one force sensor operably detecting a force involved in setting a rivet.

27. (Withdrawn and Currently Amended) ~~A fastening element system, the~~
The system of Claim 77, further comprising:

~~a fastening element including:~~
~~a mandrel; and~~
~~a hollow shaft including:~~
~~a setting head at a shaft first end;~~
~~a deformation segment operably forming a closure~~
head;
~~a connecting segment configurable inside the shaft;~~

and

~~a shaft second end opposed to the setting head
having a punching edge extending substantially along an outermost periphery of the
shaft;~~

a die operable to create a punch opening having a variable diameter in
[[the]] at least one part, the die including at least two segments operably absorbing a
punching force and operably forming the punch opening capable of accommodating the
closure head of the fastening element;

a die receptacle having the segments movably lodged therein; and

at least one spring element operably holding the segments together.

28. (Withdrawn) The system of Claim 27, wherein the segments are radially
displaceable.

29. (Withdrawn) The system of claim 27, comprising:
each segment including a planar bearing surface; and
the die receptacle including a substantially planar countersurface operably
transmitting the punching force to the die receptacle.

30. (Withdrawn) The system of Claim 27, wherein each segment comprises a
spring element receptacle.

31. (Withdrawn) The system of Claim 27, wherein the die receptacle comprises an annular stop.

32. (Withdrawn) The system of claim 31, further comprising:
the annular stop including an annular stop surface; and
each segment including a segment stop surface;
wherein the segment stop surface is positionable behind the
annular stop surface in relation to the at least one part by a distance ranging between
0.1 to 0.3 mm, the distance operably ensuring mobility of the segments during a
fastening element setting operation.

33. (Withdrawn) The system of Claim 32, wherein the distance ranges
between 0.15 mm to 0.25 mm.

34. (Withdrawn) The system of Claim 27, comprising less than five of the
segments.

35. (Withdrawn) The system of Claim 27, wherein the spring element
comprises a rubber ring.

36. (Withdrawn) The system of Claim 27, wherein the spring element
comprises a spiral ring.

37. (Withdrawn) The system of Claim 27, wherein the die comprises a transversely extendable vent hole.

38. (Withdrawn) The system of Claim 27, wherein the punch opening formable by the segments comprises a rotationally asymmetrical cross section.

39. (Withdrawn) The system of Claim 38, wherein the punch opening comprises a substantially polygonal cross section.

40. (Withdrawn) The system of Claim 39, wherein the punch opening comprises a tooth when viewed in cross section.

41-52. (Cancelled)

53. (Withdrawn and Currently Amended) The device system of Claim 78 ~~[[51]]~~, wherein the ~~machine comprises a die~~ further comprises including movable die segments surrounding a central passageway.

54. (Withdrawn and Currently Amended) The device system of Claim 78, further comprising 51, ~~wherein the machine comprises~~ a force sensor.

55. (Withdrawn and Currently Amended) The device system of Claim 78 ~~[[51]]~~, wherein the mandrel includes an enlarged head.

56. (Withdrawn and Currently Amended) The device system of Claim 78 further comprising a hollow ~~51~~, wherein the shank extending from the setting includes a flanged head.

57. (Withdrawn and Currently Amended) The device system of Claim 56 ~~[[51]]~~, further comprising at least a second workpiece retained to a ~~[[the]]~~ first workpiece by the shank, a portion of the setting head ~~shank~~ being disposed between the workpieces and an attached ~~the~~ accessory.

58-60. (Cancelled).

61. (Withdrawn and Currently Amended) The device system of Claim 78 ~~[[59]]~~, wherein the mandrel is non-frangible.

62. (Withdrawn and Currently Amended) The device system of Claim 78 ~~[[59]]~~, wherein the mandrel includes a frangible stem and an enlarged head opposite the ram.

63. (Withdrawn and Currently Amended) The device system of Claim 78 ~~[[58]]~~, wherein the ram includes the ~~[[a]]~~ mandrel and the fastening element ~~rivet~~ includes an expandable shank, the mandrel being threadably engageable with the shank.

64-76. (Cancelled).

77. (New) A fastener setting system, comprising:

a fastener including:

(i) a mandrel having a foot and a head; and

(ii) a hollow shank including:

(a) an enlarged flange adjacent a first end;

(b) a deformation segment deformable to form a closure

head; and

(c) a connecting segment, adjacent an opposite second end,

contacting with the mandrel foot;

a ram pushing against the head of the mandrel to operably advance the fastener; and

a traction tool operably pulling the mandrel relative to the shank in order to form the closure head at the deformation segment.

78. (New) A device, comprising:

a self-piercing fastening element comprising a setting head and a mandrel;

a die;

a ram operably advancing the fastening element;

a holder operably holding the setting head; and

a retractor operably retracting the mandrel;

wherein the ram and the holder are movable relative to the die independently of each other in at least one operating condition.

79. (New) The device of Claim 78, wherein the mandrel comprises an external thread operably forming a releasable connection with the fastening element.

80. (New) The device of Claim 78, further comprising workpieces receiving the fastening element, wherein the die comprises a disposal passage operably disposing each of a plurality of punched parts of the workpieces.

81. (New) The device of Claim 78, further comprising a counterforce structure operable to dynamically interlock the ram and the die.

82. (New) The device of claim 78, wherein the ram directly contacts against and pushes the mandrel toward the die.